Novelties in Guianian *Endlicheria* (Lauraceae)

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ABSTRACT. Two new species of *Endlicheria* are described, illustrated, and discussed. *Endlicheria canescens* has hitherto been confused with *Ocotea endlicheriopsis* Mez, and *Endlicheria chalisea* was previously known only by the densely pubescent cupules of fruiting material.

Two undescribed species were encountered during preparation of a revision of the Guianian members of *Endlicheria*. Described by Nees in 1833, this neotropical genus currently accommodates all dioecious Lauraceae that possess exinvolucrate thyrsoid or thyrso-paniculate inflorescences and two-thecous anthers. Although this generic concept has attracted recent criticism (Rohwer et al., 1991), it is maintained while the genus awaits monographic attention. At the species level, taxonomic delimitation in *Endlicheria* is complicated by dioecy. Species circumscription depends on the association of male and female specimens and must confront sexual dimorphism in floral structures. Fortunately, vegetative features are relatively constant between the sexes and may be used to support species concepts based on floral characters. Each of the new species here proposed is circumscribed by unique combinations of vegetative and reproductive features.

Endlicheria canescens Chanderbali, sp. nov. TYPE: Suriname. Sarramacca R., Toekoemoetoe Ck., 5 Oct. 1944 (fl), *Maguire 24898a* (holotype, MO; isotypes, K, NY, US). Figure 1.

A ceteris speciebus *Endlicheriae* habito magno et pilis erectis in pagina interiori tepalorum recedit.

Trees to 35 m tall, and up to 50 cm DBH; from terra firme forests. *Branchlets* initially angular, soon terete; densely covered with short (up to ca. 0.3 mm), straight to crookedly erect reddish brown hairs; eventually becoming glabrous. Terminal buds similarly densely covered with short, erect reddish brown hairs. Petioles 1.5–2.5 cm long; sulcate along most of their length, dorsoventrally flattened and broadly canaliculate near the base; indument consisting of the same dense cover of short, erect reddish brown hairs found on the branchlets. Leaves 10–20 × 5–8 cm; alternate and evenly spaced along the twigs; elliptic with recurved margins; chartaceous. Leaf apex acuminate; base obtuse, often obliquely meeting the petiole. Venation essentially pinnate, with 4–7 pairs of secondary veins. Midrib and secondary veins impressed above, strongly raised below. Intercostal venation scalariform, consisting of roughly parallel tertiaries that are arranged perpendicular to the midvein. Tertiary veins flat above, strongly raised below. Upper and lower leaf surfaces with the same indumentum as the petioles and twigs; more densely pubescent on the veins. Indument usually persistent only on the veins of the upper leaf surface but persistent on the entire lower leaf surface. *Inflorescences* borne in the axils of the foliage leaves; thyrso-paniculate; often up to 15 cm long. Inflorescence peduncle and lateral branches covered by the same short, erect indument as the twigs. Pedicels and distal internodes of cymes well developed, individual flowers clearly distinguishable. Bracts of lateral branches and bracteoles subtending individual flowers narrowly lanceolate in shape; to 4 mm and 1.5 mm long, respectively; densely covered with erect hairs; caducous at anthesis. Flowers distinctly pedicellate. Pedicels 2–3 mm long; bearing a sparse cover of erect brownish yellow hairs. *Male flowers* pale yellow-green; ca. 5 mm diam. at anthesis. Hypanthium broadly infundibuliform; ca. 2 mm deep × 3 mm wide; outer surface with a sparse cover of short, erect brownish yellow hairs; inner surface densely covered with short, erect gray-white hairs. Tepals ca. 1.5 × 1.5 mm wide; obovate; at anthesis patent, causing the internal floral structures to be clearly exposed; outer surface bearing a lax cover of ascendingly erect reddish brown hairs that becomes sparser toward the margins where it is replaced by a dense cover of extremely curly dark red hairs; inner surface covered by a dense growth of erect gray-white hairs. Stamens of all whorls with pubescent filaments that are indistinctly differentiated from their two-thecous anthers. Anthers of the outer two whorls of stamens ovate; thecae introrse-latrorse; connectives acutely elongated. Anthers of the inner or third whorl of

stamens obovate; thecae extrorse-latrorse; connectives not extended. Basal glands essentially globose, broadly apiculate; sessile. Pistillode fusiform, glabrous. *Female flowers* generally similar to male flowers but different in the glabrous inner surface of the hypanthium and the slightly smaller sterile stamens all of which possess distinctly narrower filaments. Ovary superior, half enclosed by the hypanthium; completely glabrous; stigma reniform, supported by a short thick style. *Cupules* fleshy, sub-hemispherical, ca. 1.5–1.7 cm diam., margin simple and entire, walls heavily thickened, glabrous without, densely sericeous within. Fruiting pedicel 2–3 mm long. Berries spheroid, up to 0.7 cm long.

Collections of *Endlicheria canescens* have mistakenly been considered to be conspecific with *Ocotea endlicheriopsis* Mez (Mez, 1889), and used to justify the combination *Endlicheria endlicheriopsis* (Mez) Kostermans (Kostermans, 1936). The holotype material of *Ocotea endlicheriopsis* specified by Mez is *Melinon 605* from French Guiana. I have not seen this specimen, but I have seen three other Melinon collections (*Melinon s.n.*, *36*, and *276*; all from French Guiana and deposited at P). These specimens have been annotated as isotypes but were not cited in the original publication of *Ocotea endlicheriopsis*, and were not listed among those seen by Mez (1892). However, they agree with the description of *Ocotea endlicheriopsis* and correspond well with the type photograph of *Melinon 605* located at MO. Given the possibility that there may have been errors in the numbering of these sheets, I am prepared to accept them as isotypes. These are all fruiting collections, but examination of the few persistent flowers has revealed that the anthers are unquestionably four-thecous in the manner characteristic of *Ocotea*. In addition, the tightly crinkled indument of these specimens is characteristic of a few *Ocotea* species including *O. rufovestita* Ducke and *O. indirectinervia* C. K Allen, but unmatched in *Endlicheria*. Therefore, Mez's generic placement of Melinon's collections was correctly determined, and the collections of *Endlicheria* that have been associated with the name *Endlicheria endlicheriopsis* represent an undescribed species.

Although having finally received taxonomic recognition, *Endlicheria canescens* still remains poorly collected and therefore poorly understood. The available material indicates that individuals of this species are canopy trees reaching up to 35 m in height and 50 cm DBH. The flowers are relatively large and robust for *Endlicheria*, and perhaps the most striking feature of these is the dense cover of grayish bristle-like hairs on the inner surface of the tepals. These are often rendered even more conspicuous by the tendency of the tepals to spread widely open at anthesis. The lower leaf surfaces sometimes bear flattened waxy globules that collectively furnish a glaucous appearance. However, specimens treated with alcohol or subjected to excessive heat during drying may not show this character.

Distribution. *Endlicheria canescens* is known from the montane evergreen forests around the Guyana–Venezuela border and from the lowland evergreen forests of Suriname, Ecuador, and Peru. See Figure 2.

Phenology. Flowering specimens have been collected in January, June, September, and October.

Paratypes. ECUADOR. **Napo:** Aguarico Canton, Reserva Faunística Cuyabeno, Río Zancudo, 230 m, 5 Oct. 1991 (fl), *Palacios et al. 8164* (MO), *Palacios et al. 8165* (MO); Parque Nacional Yasuni, 200 m, 28 May–8 June 1988 (fr), *Ceron & Hurtado 3882* (MO). GUYANA. **Essequibo:** Upper Mazaruni R. Basin, Kamarang R., 24 Oct. 1960 (fl), *Tillett & Tillett 45789* (K, NY, US). PERU. **Loreto:** Prov. de Alto Amazonas, Cerros Campanquiz at Pongo de Manseriche, Río Maranon, 30–550 m, 19–21 Oct. 1962 (fl), *Wurdack 2362* (NY). SURINAME. Natuurpark Brownsberg, 23 June 1925 (fl), *Forest Bureau 6884* (MO, U), 10 Sep. 1969 (fl), *LLB 12570* (MO, U), June 1917 (fl), *Forest Bureau 2936* (MO, U), 10 Sep. 1917 (fl), *Forest Bureau 3197* (NY, U), June 1922 (fl), *Forest Bureau 5884* (U, US). VENEZUELA. **Bolívar:** between San Ignacio de Yaruni and San Francisco de Yaruni, 1200 m, 4 Jan. 1975 (fl), *Steyermark 111387* (NY).

Endlicheria chalisea Chanderbali, sp. nov. TYPE: Guyana. Potaro-Siparuni region, Kato and vicinity, dry forest N of town, 750 m, 19 Mar. 1989 (fl), *Hahn et al. 5795* (holotype, MO; isotype, U). Figure 3.

Ad subgenus *Ampelodaphne* ob inflorescentias condensatas pertinens sed foliis alternis et insigniter cupulis extus dense aureo-tomentosis distinguenda.

Medium-sized *trees* usually about 8 m tall and ca. 10 cm DBH, rarely up to 20 m tall; known only from terra firme forests. Branchlets initially cylindrical; densely covered with relatively long (up to ca. 1 mm) rigidly erect yellowish or flaxen hairs, at last becoming glabrous. Terminal buds similarly densely covered with ascendingly erect rather stiff hairs. Petioles 2.5–5.5 cm long, semiterete; indument consisting of the same stiffly erect hairs found on the branchlets. Leaves relatively large, 15–30 × 7–13 cm; alternate, in flowering material apparently distally clustered but the internodes eventually extend and the leaves of fruiting material are widely spaced along the twigs; obovate with recurved margins; charta-

Figure 1. *Endlicheria canescens* Chanderbali. —A. Flowering branchlet, showing widely spaced leaves and axillary inflorescences. —B. Cymose branchlet, showing bracteoles only beneath floral buds. —C. Male flower, showing pubescent tepals and filaments. —D. Longitudinal section of a male flower, showing pistillode and pubescent interior of

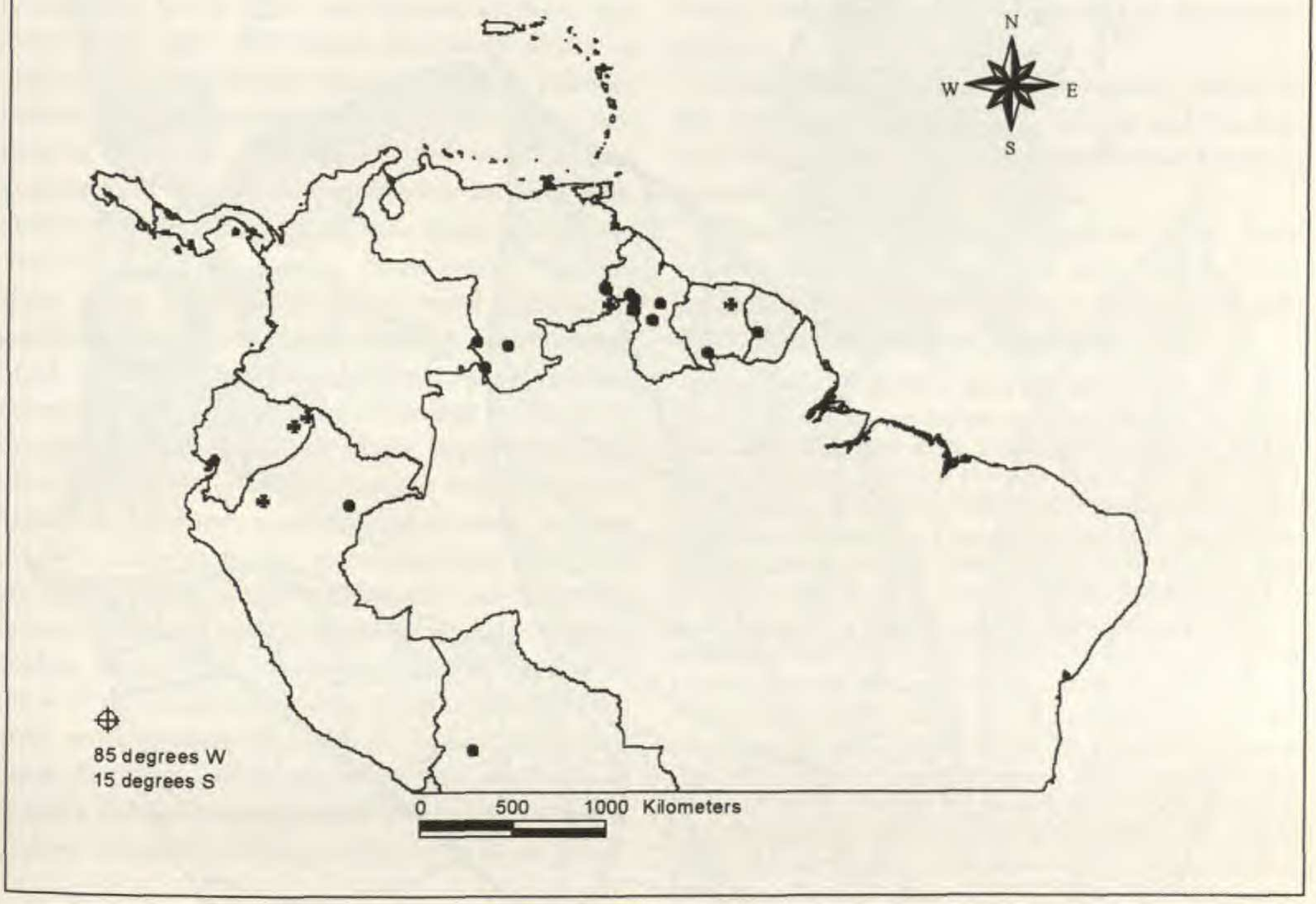

Figure 2. Distribution of *Endlicheria canescens* Chanderbali (✣), and *E. chalisea* Chanderbali (●). The map of the Neotropics was generated from the Digital Charts of the World Database by the GIS software ARCINFO, and the distribution points were generated by Arcview from geographical coordinates on specimen labels.

ceous. Leaf apex acuminate; base acute. Venation essentially pinnate, with 6–14 pairs of secondary veins. Midveins impressed above, strongly raised below. Secondary veins slightly convex above, strongly raised below. Intercostal venation mixed, dominated by lateral intersecondaries in the inner and percurrent tertiaries in the outer half. Tertiary veins ± level with the leaf surface above, strongly raised below. Upper and lower leaf surfaces with the same indumentum characteristic of the twigs; more densely pubescent on the veins. Indument usually persistent only on the veins of the upper leaf surface but persistent on the entire lower leaf surface. *Inflorescences* borne in the axils of the foliage leaves; thyrso-paniculate often up to 7 cm long. Inflorescence peduncle and lateral branches pubescent as the twigs. Pedicels and distal internodes of cymes shortened, flowers arranged in dense clusters. Bracts of lateral branches, and bracteoles subtending individual flowers, lanceolate in shape; to 3 mm and 1 mm long, respectively; densely covered with ascendingly erect hairs; persistent at anthesis. Flowers ± sessile. *Male flowers* off-white; ca. 3 mm diam. at anthesis. Hypanthium infundibuliform; ca. 1 mm deep × 1 mm wide; outer surface densely covered with long, crookedly erect, flaxen to reddish brown hairs; inner surface completely covered with short appressed hairs. Tepals ca. 1.3 × 1.0 mm, elliptic; at anthesis erect and not revealing the internal floral structures or the very tips slightly recurved and the internal structures scarcely exposed; outer surface bearing a markedly sparser cover of the erect hairs found on the hypanthium below; inner

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the hypanthium. —E. Stamen of series II, showing protruding connective and latrorse-introrse dehiscence. —F. Stamen of series III, showing indistinct filaments and apiculate basal glands. —G. Lower leaf surface, showing oblique base. A–G, drawn from holotype.

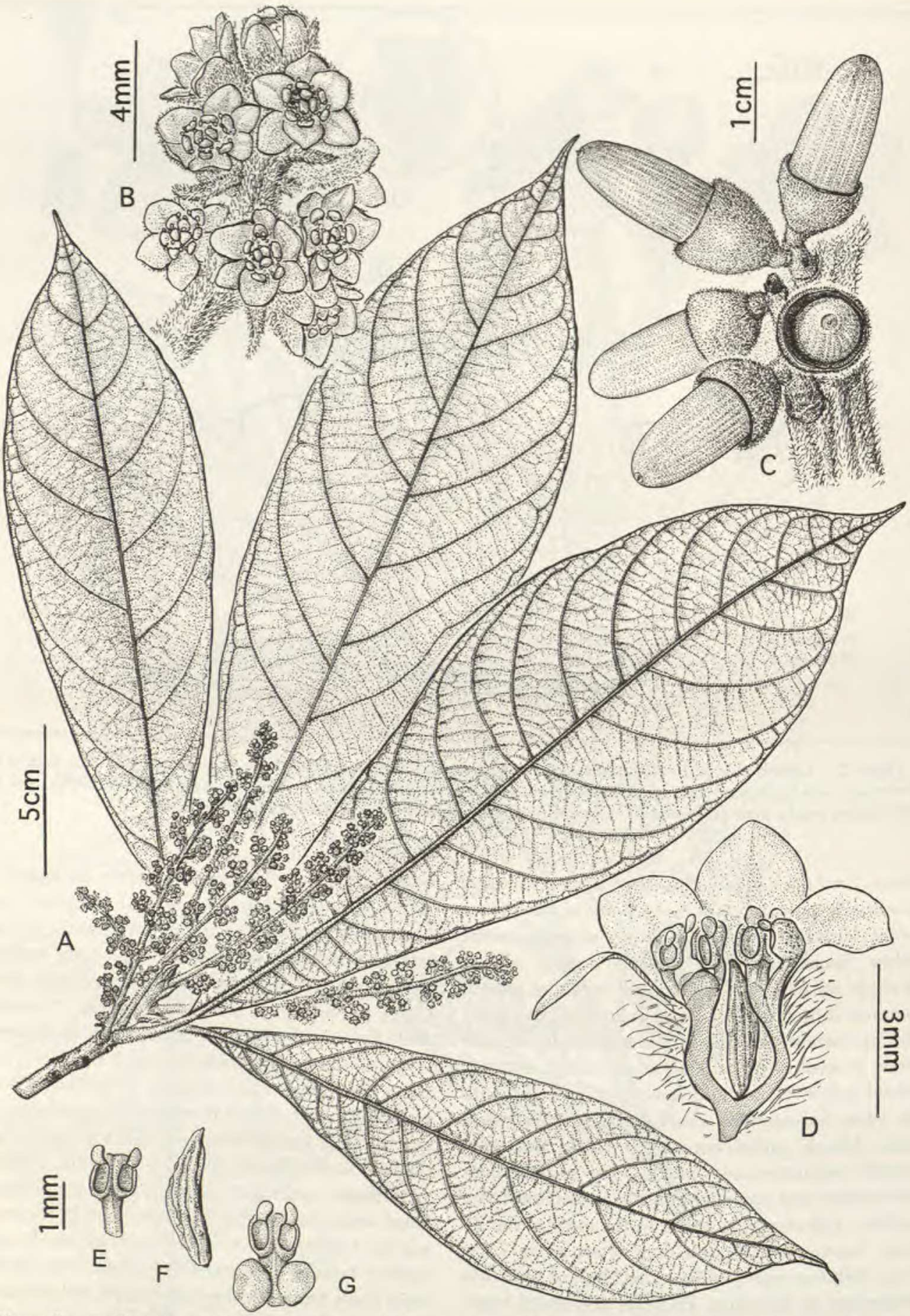

Figure 3. *Endlicheria chalisea* Chanderbali. —A. Flowering branchlet, showing distally clustered leaves and axillary inflorescences with densely clustered flowers. —B. Inflorescence branchlet, showing persistent bracteoles. —C. Fruits, showing large berries in densely pubescent subsessile cupules. —D. Longitudinal section of a male flower, showing pistillode and short appressed hairs of the hypanthium. —E. Stamen of series I, showing distinct filament, large thecae and latrorse-introrse dehiscence. —F. Pistillode. —G. Stamen of series III, showing distinct filaments and sessile basal globose glands. A, B and D–G drawn from holotype, C drawn from *Acevedo 3432*.

surface entirely glabrous except for a dense papillose indumentum on the tepal tips. Stamens of all whorls with glabrous filaments that are distinctly narrower below their two-thecous anthers. Anthers of the outer two whorls depressed elliptic to depressed ovate; thecae introrse-latrorse; connectives apically expanded into a broad flat ridge. Anthers of the inner or third whorl of stamens oblong to depressed oblong; thecae extrorse-latrorse; connectives not apically extended. Basal glands essentially globose; sessile. Staminodes reaching about ¼ the length of the inner whorl of stamens; usually bearing a distinctly swollen elliptic-ovate head. Pistillode fusiform, glabrous. *Female flowers* generally similar to male flowers but different in the glabrous inner surface of the hypanthium and the slightly smaller sterile stamens with pubescent filaments. Ovary superior, glabrous; stigma 3-lobed. *Cupules* fleshy; hemispherical; ca. 1.7–2 cm diam.; margin simple and entire; outer surface densely covered with persistent, slightly crooked golden or reddish brown erect hairs similar to those of the branchlets; inner surface densely covered with golden or reddish brown appressed hairs. Fruiting pedicel absent or very short and as densely pubescent as the cupules; fruits ± sessile. Berries elliptic to oblong, often up to 4 cm long.

Endlicheria chalisea, named for its golden pubescent cupules, represents the latest addition to the subgenus *Ampelodaphne* Mez. Such densely pubescent cupules are otherwise unknown in *Endlicheria*. Fruiting specimens are therefore easily distinguished from related species, but flowering specimens are not as conspicuous. Flowering material bear the densely flowered bracteate inflorescences typical for the subgenus and have either been annotated as *Endlicheria sp.* or attributed to other species. However, the combination of alternate (as opposed to sub-verticillate) leaves, distinctly sessile flowers, and relatively large sessile basal glands allows distinction of flowering specimens of this species from its closest relatives. Most specimens of *E. chalisea* bear obovate leaves. However, a fruiting collection from the Merume Mts., Guyana (*Tillett 43990*), and a flowering specimen from the Arboretum Jenaro Herrera, Peru (*Valcarcel & Chota 1/98*), have broadly elliptic leaves. The fruiting specimen has pubescent cupules, but these are rather decrepit and may be diseased, as indicated on the label. The flowering specimen has smaller flowers and stamens with more slender filaments but otherwise conforms well with flowering material from the Guianas. These specimens may represent a different species but are included in *E. chalisea* because the variation in leaf shape, fruit development, and floral structures is entirely within the range exhibited by many species of lauraceous genera.

Distribution. Submontane evergreen forests in the Guianas, Venezuela, and Bolivia and the lowland evergreen forests of the Brazilian and Peruvian Amazon. See Figure 2.

Phenology. Flowering specimens have been collected in March, June, July, and August. Fruiting collections have been made in February, March, April, June, August, and November.

Paratypes. BOLIVIA. **La Paz:** Sud Yungas Province, 7 km de Huancané en carretera a San Isidro, 2300 m, 13 Dec. 1989 (fl), *Smith et al. 13908* (MO). BRAZIL. **Amazonas:** Manaus, Reserva Forestal Ducke, 27 June 1964 (fl), *Rodrigues & Loureiro 5926* (MO); Mun. de Presidente Figueredo, Estrada do Canteiro, Usina Hidroeletrica de Balbina, 230 m, 15 July 1990 (fl), *Cid Ferreira et al. 7582* (MO, NY). **Pará:** Mun. Oriximina, Rio Trombetas, terra firme adjacent to lago Moura, 25 Aug. 1980 (fl), *Cid Ferreira et al. 1832* (MO). FRENCH GUIANA. Rivière Grand Inini-Bassin du Maroni, 11 Aug. 1990 (st), *Sabatier & Prévost 3195* (MO). GUYANA. **Essequibo:** Bartica–Potaro Road, 107 mil., 16 Nov. 1963 (fr), *Fanshawe* in *Forest Dept. 4237* (MO); Cuyuni-Mazaruni region, along Koatse R., ca. 2 km W of Pong R., ca. 5 hrs. walk from Chinoweing, 600–650 m, 25 Feb. 1987 (fr), *Pipoly et al. 10607* (MO); Mabura Region, Kurupukari main, 6 km, 23 Mar. 1994 (fr), *Ek & Hammond 1033* (MO); N. Pakaraimas, Ciong Valley, Manawarrai Mt., 2000 m, 1 June 1995 (fr), *Mutchnick 1464* (MO); U. Takatu-U. Rupununi, road from Lethem to 25 km past Surama Village entrance, 90–110 m, 28 Feb. 1990 (fr), *Acevedo 3432* (MO); Upper Mazaruni R. Basin, Mt. Ayangana, 800–900 m, 16 Aug. 1960 (fr), *Tillett et al. 45163* (K, MO, NY, US); Upper Mazaruni R. Basin, Partang R. Perume Mts., 1140 m, July 1960 (fr), *Tillett et al. 43990* (K, MO, NY, US). PERU. **Loreto:** Requena, Arboretum Jenaro Herrera, 8 July 1986 (fl), *Valcarcel & Chota 1/98* (MO). VENEZUELA. **Amazonas:** Atabapo, Alto Río Casiquiare, 160 m, 6 Mar. 1990 (fr), *Aymard & Delgado 8483* (MO); Atabapo, Caserio Paloma, Río Atacari, Nov. 1989 (fr), *Velasco 1032* (NY, MO); San Carlos de Río Negro, ca. 20 km S of confluence of Río Negro and Brazo Casiquiare, 4.3 km NNE on Solano Road, 119 m, Feb. 1982 (fr), *Clark & Maquirino 8324* (NY, MO).

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